INSTRUCTIONS

-J03796 REV. 06-23-2005

Kit Number 29868-06

V-ROD® SCREAMIN' EAGLE® BIG-BORE STAGE KIT

General

The street legal V-Rod Screamin' Eagle (SE) Big-Bore Stage Kit fits Harley-Davidson 2006 VRSCA models.

See the Service Parts illustration for a list of the kit contents.

NOTE

A V-Rod with an installed V-Rod Screamin' Eagle Big-Bore Stage Kit is street legal in 50 states when used with the stock mufflers.

CAUTION

You must recalibrate the ECM when installing this kit. Failure to properly recalibrate the ECM can result in severe engine damage. (00399b)

ECM calibration is required and is available for use with stock mufflers.

Additional Parts Required

Engine removal from the chassis and engine disassembly require a number of new replacement parts. The new gaskets are found in the Engine Overhaul Gasket Kit (Part No. 17011-01K), which is included in the V-Rod SE Big-Bore Stage Kit.

The connecting rod journal bearings and the crankshaft journal bearings must be replaced with new bearings regardless of service wear limits.

NOTE

The Specifications and Service Wear Limits for the V-Rod SE Big-Bore engine are the same as the those for the VRSCSE Screamin' Eagle 1250 engine found in the VRSCSE Service Manual Supplement.

Inspection of other parts for service wear limits may indicate additional part replacement.

Part numbers for any required new or worn part replacements can be found in the VRSC or the VRSCSE parts catalog.

Additional Tools Required

Each Service Manual or Supplement procedure will require special tools. These tools are specified in the Service Manual or Supplement and are available through the SPX Kent-Moore Special Service Tools catalogue.

⚠WARNING

The rider's safety depends upon the correct installation of this kit. Use the appropriate service manual procedures. If the procedure is not within your capabilities or you do not have the correct tools, have a Harley-Davidson dealer perform the installation. Improper installation of this kit could result in death or serious injury. (00333a)

NOTE

This instruction sheet directs the installer to both the Service Manual and the Service Manual Supplement. A Service Manual and a Service Manual Supplement for the year and model motorcycle is available at a Harley-Davidson Dealer.

Prepare the Motorcycle for Service

1. Remove the right side cover and the Maxi-Fuse.
2. Follow Service Manual instructions to remove the air box cover.

⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect battery cables (negative (-) cable first) before proceeding. (00307a)

⚠WARNING

Disconnect negative (-) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00049a)

3. Disconnect the battery, negative (-) cable first.

Installation

The V-Rod SE Big-Bore Stage Kit is installed in eight steps:

1. Remove the engine from the chassis.
2. Remove the cam drive and cylinder heads.
3. Separate the upper and lower crankcases.
4. Prepare the upper crankcase for machining.
5. Order/packaging procedure for crankcase machining.

6. Install the SE cylinder liners and pistons in the upper crankcase.

7. Assemble the engine.

8. Install the engine in the chassis.

NOTE

The box and foam hold-down blocks found in the kit are used to ship the upper crankcase for machining. May Technology & Mfg., Inc., will ship the completed upper crankcase back in the same box.

Step 1. Remove the Engine from the Chassis

⚠WARNING

Coolant mixture contains toxic chemicals, which may be fatal if swallowed. If swallowed, do not induce vomiting; call a physician immediately. Use in a well ventilated area. Irritation to skin or eyes can occur from vapors or direct contact. In case of skin or eye contact, flush thoroughly with water and go to hospital, if necessary. Dispose of used coolant according to federal, state and local regulations. (00092a)

⚠WARNING

When servicing the fuel system, do not smoke or allow open flame or sparks in the vicinity. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00330a)

1. Follow the Service Manual CHASSIS: ENGINE REPLACEMENT procedure to remove the engine from the chassis.

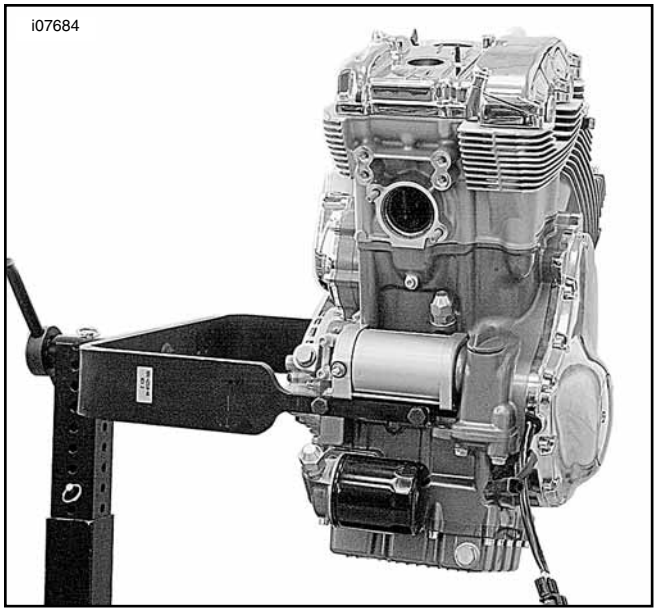


Figure 1. Engine in Cradle

2. See Figure 1. Follow the Service Manual ENGINE: STRIPPING MOTORCYCLE FOR SERVICE procedure to mount the engine in the engine cradle and stand.

Step 2. Remove the Cam Drive and Cylinder Heads

1. Follow the Service Manual ENGINE: THROTTLE BODY procedure to remove the throttle body.

2. Follow the Service Manual ELECTRICAL: ALTERNATOR procedure to remove the alternator cover.

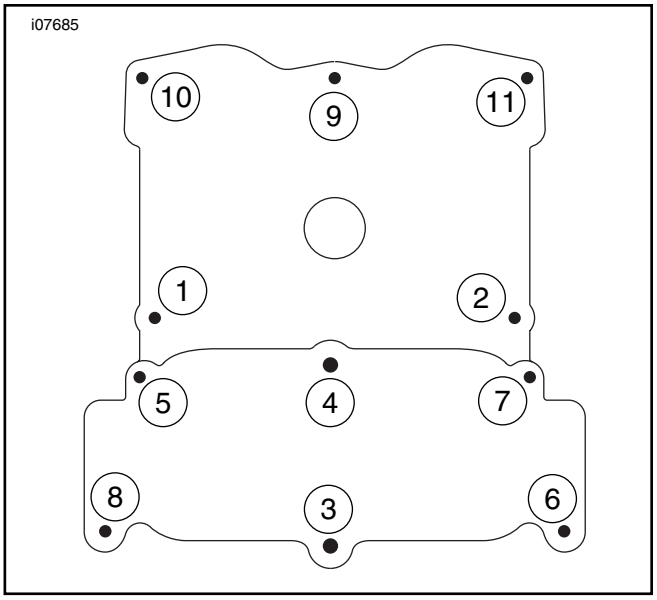


Figure 2. Cam Cover Torque Sequence

3. See Figure 2. Break the cam cover fasteners loose in reverse order of torque sequence and remove the cover.

4. Follow the Service Manual ENGINE: TOP END DISASSEMBLY, Cam Drive Removal procedure to remove the cam drive and the cams.

NOTE

Set the cam journal caps, bolts and exhaust cam aside for installation. Remove the bolts from the intake cam drive sprockets and set the sprockets and bolts aside. The intake cams will be replaced with new cams from the V-Rod Screamin' Eagle (SE) Big-Bore Stage Kit.

5. Inspect the following components for service wear limits or wear indicators and replace as required:

   a. Chain guides

   b. Sprockets

6. Follow Service Manual ENGINE: CYLINDER HEAD SERVICE, Head Disassembly procedure to remove the cylinder heads.

7. Remove the front cylinder head cam drive cavity breather tube and O-ring and set aside for installation on the SE cylinder head.

NOTE

Follow the procedures only through removing the heads from the upper crankcase. The heads and valve train components will be replaced with new parts from the V-Rod Screamin' Eagle (SE) Big-Bore Stage Kit.

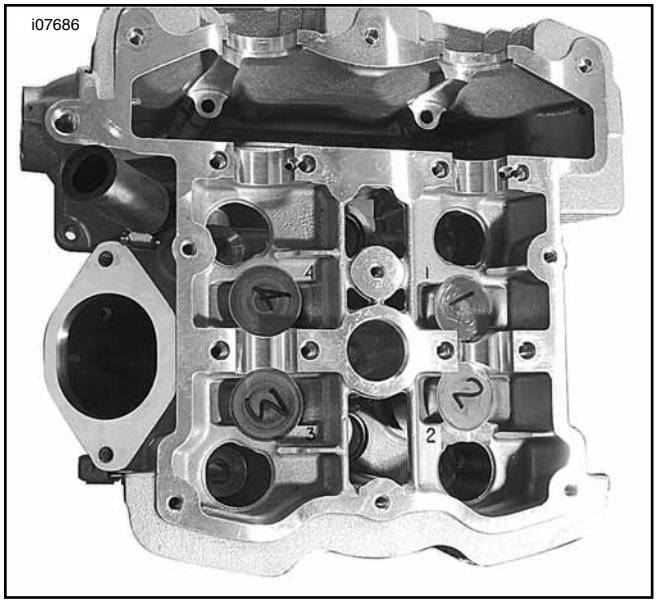


Figure 3. Cylinder Head with Numbered Tappets

8. See Figure 3. Clean the oil film from the tappets. Number each tappet with the number cast in the cylinder head.

9. Remove the tappets and the valve shims.

10. Inspect tappets and shims for wear indicators and replace as required. Set aside for installation in same location.

Step 3. Separate the Upper and Lower Crankcases

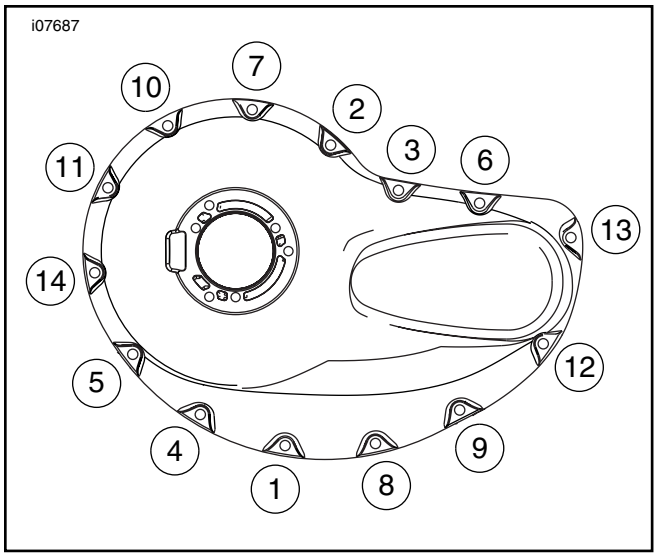


Figure 4. Clutch Side Crankcase Cover Torque Sequence

1. See Figure 4. Remove the clutch side crankcase cover fasteners in reverse order of torque sequence and remove the cover.

2. Follow the Service Manual ENGINE: CLUTCH procedure to remove the clutch.

3. Follow the Service Manual ENGINE: OIL PUMP procedure to remove the oil pump.

4. Follow the Service Manual ENGINE: UPPER AND LOWER CRANKCASE SERVICE, Disassembly procedure to separate the upper and lower crankcases.

5. Follow the procedure to break the counter balancer drive gear fastener loose.

6. Invert the engine and follow the procedure to remove the oil pan, the oil pickup and the gasket/baffle.

7. Follow the procedure to loosen the input bearing retainer fasteners.

8. Follow the procedure to loosen all four output shaft seal retainer fasteners. Remove the two output shaft seal retainer fasteners from the upper case leaving the loosened output shaft seal retainer fasteners in place in the lower case.

9. Find the crankcase torque sequence figure in the Service Manual. In reverse of the torque sequence, break each of the 19 case fasteners loose a 1/4 turn only. Then remove all the case fasteners.

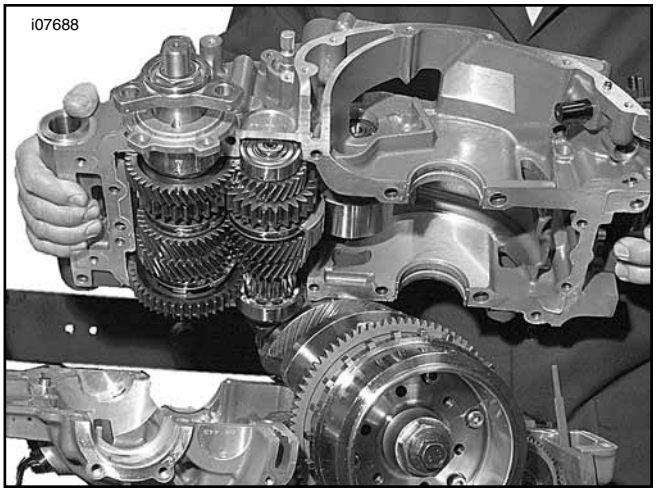


Figure 5. Separate the Lower from the Upper Crankcase

10. See Figure 5. Carefully split the crankcase halves. If necessary, use a rubber mallet.

NOTE

Follow the Service Manual procedure through splitting the cases. Mark the Service Manual page and step number to reference the starting point for reassembly. Unless there is reason, do not remove the transmission gear shafts. Set aside the lower case complete with transmission.

Step 4. Prepare Upper Crankcase for Machining

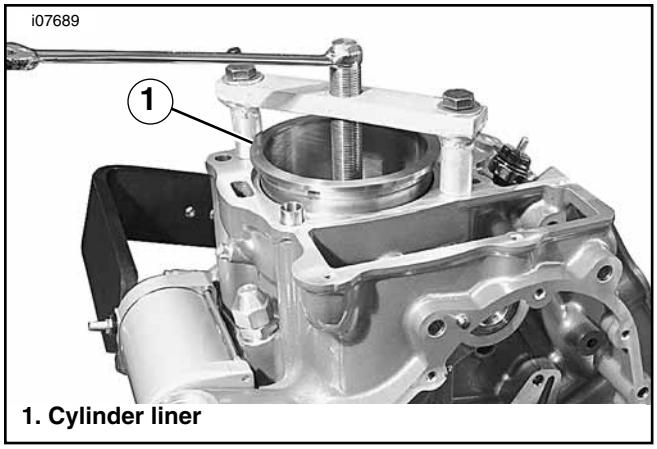
1. Follow Service Manual ENGINE: CRANKSHAFT, PISTON AND CYLINDER LINER procedure to remove the piston rods, caps and crankshaft.

2. To separate the pistons from the rods, remove and discard the wrist pin retaining rings.

3. Follow the procedure to install and torque the rod caps for measurement of the big end and the small end.

NOTE

It is not necessary to measure the piston diameter or the cylinder bore. These parts will be replaced with new.



1. Cylinder liner

Figure 6. Remove the OE Cylinder Liner

4. See Figure 6. Select remover insert for the 1130 cc engine from the CYLINDER LINER REMOVER/INSTALLER (HD-45313) and follow the instruction sheet to remove cylinder liners.

NOTE

Follow the Service Manual procedure through removing the liners. Mark the Service Manual page and step number to reference the starting point for reassembly. Inspect the upper crankcase for wear or damage and clean the case for shipping. Refer to Step 5. Order/Packaging Procedure for Crankcase Machining.

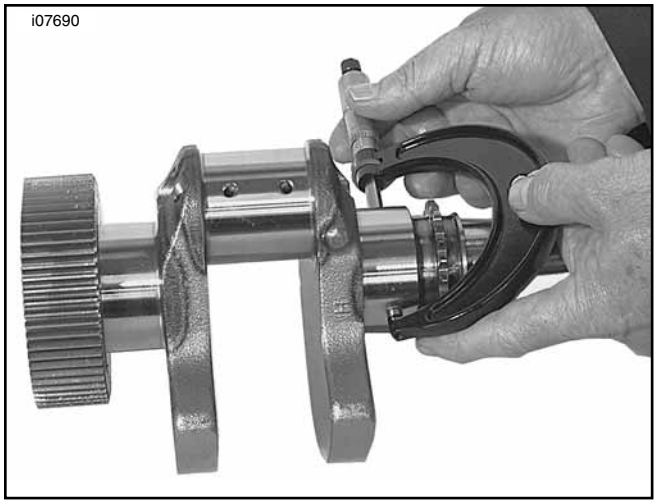


Figure 7. Measure for Service Wear Limit

5. See Figure 7. Measure or inspect the following components for service wear limits or wear indicators and replace as required:

   a. Primary gear

   b. Rod big and small end

   c. Crankshaft journal

   d. Crankshaft journal bearings (These bearings are replaced anytime the cases are separated.)

NOTE

Case machining turnaround is 2 weeks. Carefully store the chassis and miscellaneous chassis components for reassembly. Sort engine components by Service Manual procedures. Lubricate and store as required to prevent damage, corrosion or loss.

Step 5. Order/Packaging Procedure for Crankcase Machining

1. Place an order electronically in the system for crankcase machining under Part No. 24282-05K/MS.

NOTE

Enter the shipper tracking number in the "Comment" line of the system order.

2. Print and save a copy of the order acknowledgment.

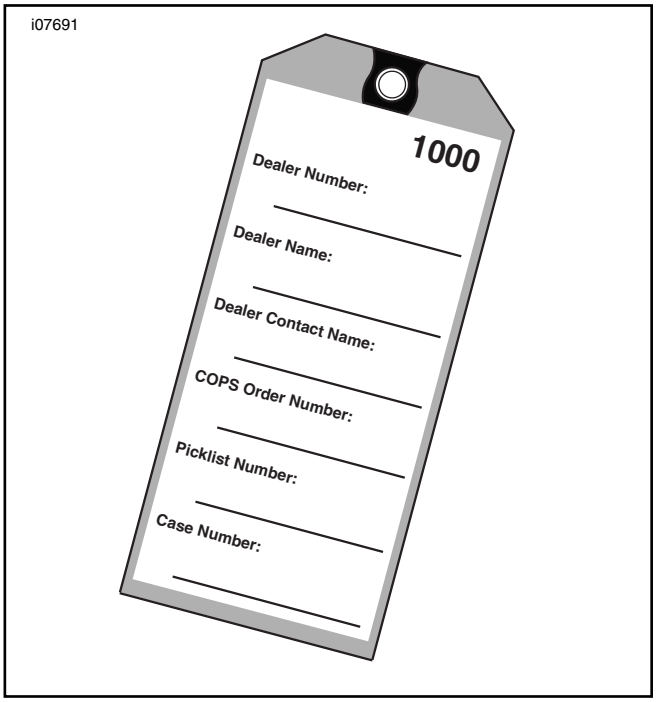


Figure 8. Tag

3. See Figure 8. Fill out all information on the tag supplied in kit (dealer number and name, a dealer contact name, the COPS order number, the Picklist number, and the crankcase number).

4. Wipe off upper crankcase and attach the original tag to the upper crankcase.

NOTE

If the crankcase arrives at May Technology & Mfg., Inc., without the tag attached, the crankcase will not be machined.

5. Place crankcase in the provided bag.

6. Place bag and crankcase in the box from the kit for crankcase shipping.

7. Place a copy of the order acknowledgment in the shipping box from the kit.

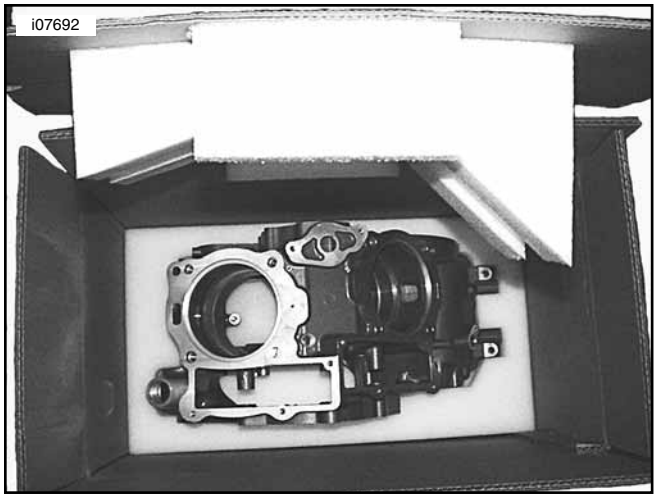


Figure 9. Case in Shipping Box with Top Hold-Down Blocks (shown without bag for clarity)

8. See Figure 9. Fit the top hold-down blocks down on top of the crankcase.

9. Close and seal the box.

NOTE

Seal the box with a minimum of packaging tape. Box will be opened at the May Technology & Mfg., Inc., and after machining will be used to return ship the upper crankcase.

10. Address the box and ship to:

May Technology & Mfg., Inc.
2922 Wheeling
Kansas City, MO 64129

NOTES

Dealer is responsible for all shipping and insurance costs.

If the crankcase is not received at May Technology & Mfg., Inc., within 30 days of order placement, the order will be cancelled and the dealer will be contacted.

For questions on order status, dealers should contact their SPOC representative.

Step 6. Install the SE Cylinder Liner and Pistons in the Upper Crankcase

1. Wash the upper case with soap and water. Lightly lubricate as required.

2. Inspect and clean the new parts from the kit as required. Lubricate the liner O-rings with engine oil.

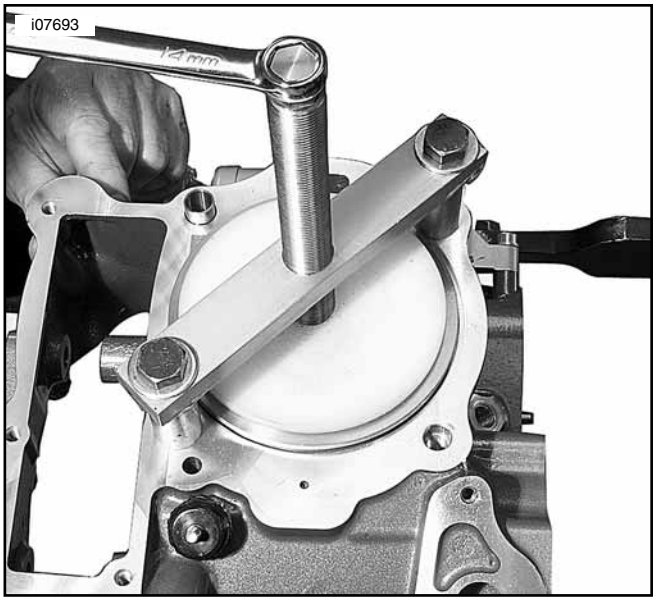


Figure 10. Install the SE Cylinder Liner

3. See Figure 10. Return to the Service Manual ENGINE: CRANKSHAFT, PISTON AND CYLINDER LINER procedure and begin assembly. Select the 1250 cc cylinder liner installer and install the SE cylinder liners following the instructions for the CYLINDER LINER REMOVER/INSTALLER (HD- 45313).

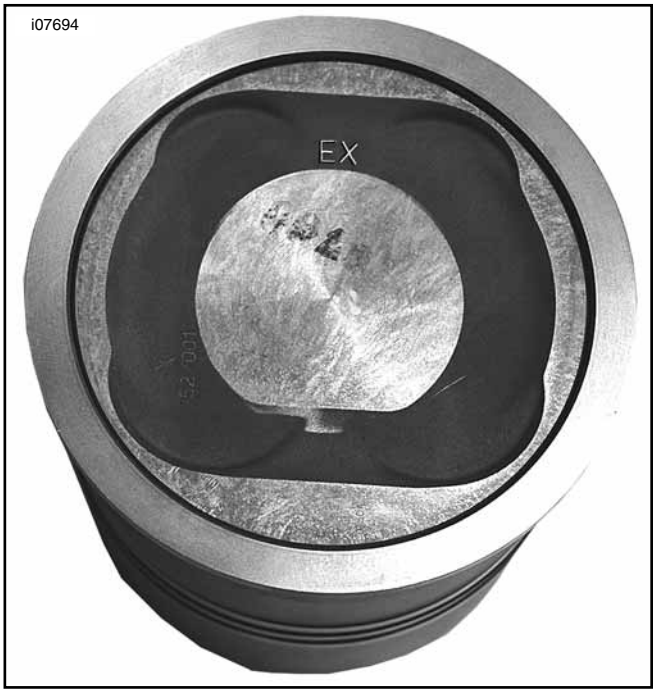


Figure 11. Orient SE Pistons to the Exhaust (EX) Valve (piston shown in cylinder liner)

4. See Figure 11. Switch to the VRSCSE Service Manual Supplement ENGINE: PISTON PIN procedure to orient the pistons to the exhaust valves and fit the SE pistons to the original equipment (OE) connecting rods.

5. Use PISTON PIN CLIP INSTALLER (HD-47189) to seat the clips.

6. Check piston ring end gap with V-Rod Screamin' Eagle Big Bore Stage Kit piston rings located in cylinder liner.

NOTE

Specifications for ring end gap are found in the Service Manual Supplement for the VRSCSE model.

7. Return to the Service Manual ENGINE: CRANKSHAFT, PISTON AND CYLINDER LINER procedure and complete installation of the pistons, rods and rod bearing journals in the upper engine case.

8. Continue with the procedures to select and install rod journal bearings; install the crankshaft and connecting rod caps.

Step 7. Assemble the Engine

1. Return to the Service Manual ENGINE: UPPER AND LOWER CRANKCASE SERVICE and page forward to the Assembly procedure and assemble the upper crankcase to the lower crankcase.

2. From the Main Bearing Journal Diameter table found in the ENGINE: CRANKSHAFT, PISTON AND CYLINDER LINER procedure, select and replace the crankshaft main bearings.

3. Return to the ENGINE: UPPER AND LOWER CRANKCASE SERVICE, Assembly procedure and mate the upper and lower engine crankcases.

4. Follow the procedure to install and tighten the case fasteners in the specified sequence to the specified torque value.

5. Follow the procedure to tighten the upper and lower transmission shaft bearing retainers, the drive sprocket flange seal retainers, and the oil pan.

6. Follow Service Manual ENGINE: CAM DRIVE procedure to assemble the triple gear, the primary chain and the fixed tensioners.

7. Holding the drive sprocket of the intake camshafts in a soft-jawed vise, break loose the two bolts holding the intake camshafts to the sprockets and remove the intake camshafts.

NOTE

The drive sprockets will only fit the intake cams in one orientation. Match the cam and drive sprocket with the double dots to the front cylinder, and match the cam and drive sprocket with three dots to the rear cylinder

8. Install the SE intake camshafts to the sprocket.

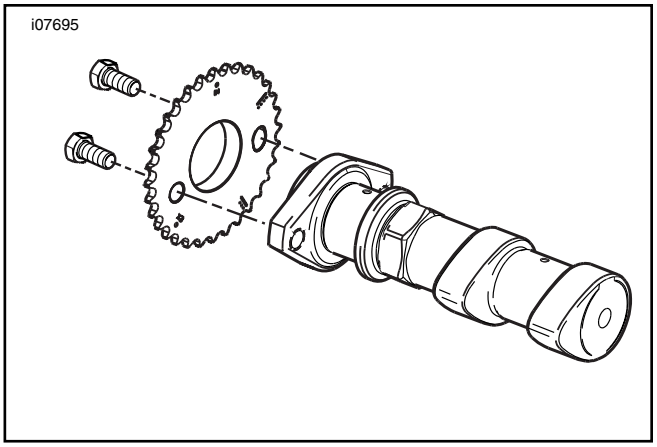
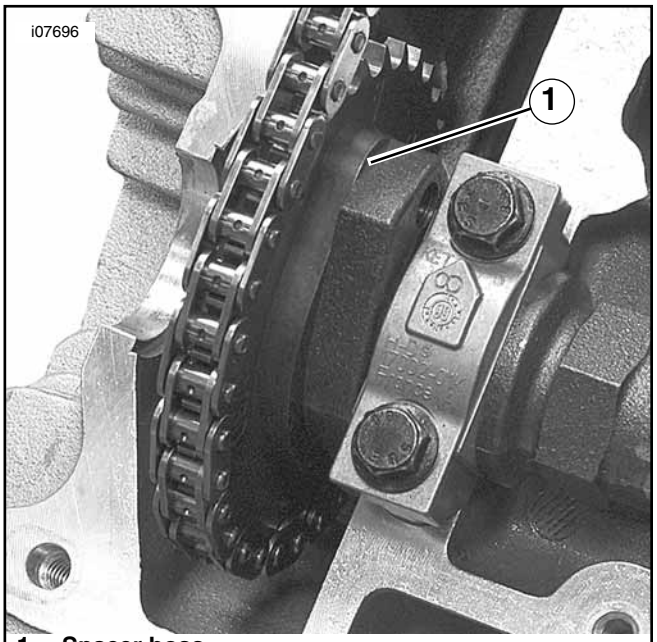


Figure 12. Drive Sprocket Orientation to Front Cylinder Intake Camshaft

a. See Figure 12. For the front cylinder, orient the spacer boss of the drive sprocket to the SE intake camshaft to the outside.



1. Spacer boss

Figure 13. Spacer Boss on Inside of Rear Cylinder Cam

b. See Figure 13. For the rear cylinder, orient the spacer boss of the drive sprocket to the inside.

9. Tighten the drive sprocket fasteners to 23 Nm (17 ft-lbs).

10. Follow Service Manual ENGINE: CYLINDER HEAD SERVICE, Head Assembly procedures. Search procedure for installing the valve shims and tappets, and continue to install the cams and cam journal caps on the SE cylinder heads. Tighten to specification.

11. Continue to follow the procedure and measure valve lash. If required, use a copy of the Valve Lash Calculation Worksheet found in the Appendix of the Service Manual. Adjust the valve lash following Service Manual MAINTENANCE: VALVE LASH, Lash Measurement and Lash Adjustment procedures.

12. Follow Service Manual ENGINE: CYLINDER HEADS, Installation procedure to install the SE cylinder heads.

13. Follow Service Manual ENGINE: INSTALLING AND TIMING THE CAMS procedure to time the cams to the cam drive.

14. Follow Service Manual MAINTENANCE: VALVE LASH, Lash Measurement procedure to verify the valve lash.

15. If required, use a copy of the Valve Lash Calculation Worksheet found in the Appendix of the Service Manual. Adjust the valve lash following Service Manual MAINTENANCE: VALVE LASH, Verify Cam Timing, and Lash Adjustment procedures.

16. After verifying lash adjustment, install and tighten spark plugs to 23 Nm (17 ft-lbs).

17. Apply a thin coat of grease, to the rubber O-ring and groove of the brass cam cavity breather tube and press into the cam drive breather hole in the front cylinder.

18. Continue the Service Manual ENGINE: INSTALLING AND TIMING THE CAMS procedure to install the gaskets and cam covers.

19. Follow the procedure to install the ball gear, needle roller bearing, thrust washer, and starter limiter gear.

20. Follow the procedure to install the rotor shell with the integral ball clutch.

21. Follow the ELECTRICAL: ALTERNATOR procedure to install the alternator cover.

22. Follow the Service Manual ENGINE: OIL PUMP, Replacement procedure to install the oil pump.

23. Follow the Service Manual ENGINE: CLUTCH, Installation procedure to install the clutch and the clutch side crankcase cover.

24. Follow the Service Manual ENGINE: THROTTLE BODY, Installation procedure to install the throttle body.

25. Install the engine label bracket and the Screamin' Eagle engine label insert.

Step 8. Install the Engine in the Chassis

⚠WARNING

Coolant mixture contains toxic chemicals, which may be fatal if swallowed. If swallowed, do not induce vomiting; call a physician immediately. Use in a well ventilated area. Irritation to skin or eyes can occur from vapors or direct contact. In case of skin or eye contact, flush thoroughly with water and go to hospital, if necessary. Dispose of used coolant according to federal, state and local regulations. (00092a)

⚠WARNING

When servicing the fuel system, do not smoke or allow open flame or sparks in the vicinity. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00330a)

1. Follow Service Manual CHASSIS: ENGINE REPLACEMENT, Installation procedure to install the engine in the chassis.

CAUTION

You must recalibrate the ECM when installing this kit. Failure to properly recalibrate the ECM can result in severe engine damage. (00399b)

NOTE

The remapping will be supplied through any authorized Harley-Davidson Dealer.

2. Before starting the engine, recalibrate the ECM.

NOTE

The product information label contained in this kit is required in the state of California only. This Executive Order label is required to aid in passing the California Smog Check Program. Place the information label on the right side of the frame directly beneath the VIN sticker. Do not place the label on motorcycles other than those specified in the Instruction Sheet.

3. Install the Executive Order (EO) label on your motorcycle.

Return the Motorcycle to Service

⚠WARNING

Connect positive (+) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00068a)

1. Install the Maxi-Fuse and the right side cover.

2. Reconnect the battery, positive (+) cable first.

⚠WARNING

When closing the seat, make sure the ignition switch is in the fuel position. If the ignition switch is in any other position when the seat is closed, the seat latch mechanism could be damaged. (00196a)

3. Close the seat.

Test Run Motorcycle

⚠WARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

⚠WARNING

Travel at speeds appropriate for road and conditions and never travel faster than posted speed limit. Excessive speed can cause loss of vehicle control, which could result in death or serious injury. (00008a)

1. Test start engine. If the oil pressure indicator lamp illuminates, follow the Service Manual ENGINE: OIL PRESSURE, Checking Oil Pressure procedure to troubleshoot the problem.
2. If there is a rattle heard during engine start-up, follow Service Manual MAINTENANCE: SECONDARY CAM CHAIN procedure to adjust the secondary cam chain.
3. Test ride motorcycle and adjust controls, belt tension, wheel alignment, headlamp alignment, etc., as required.

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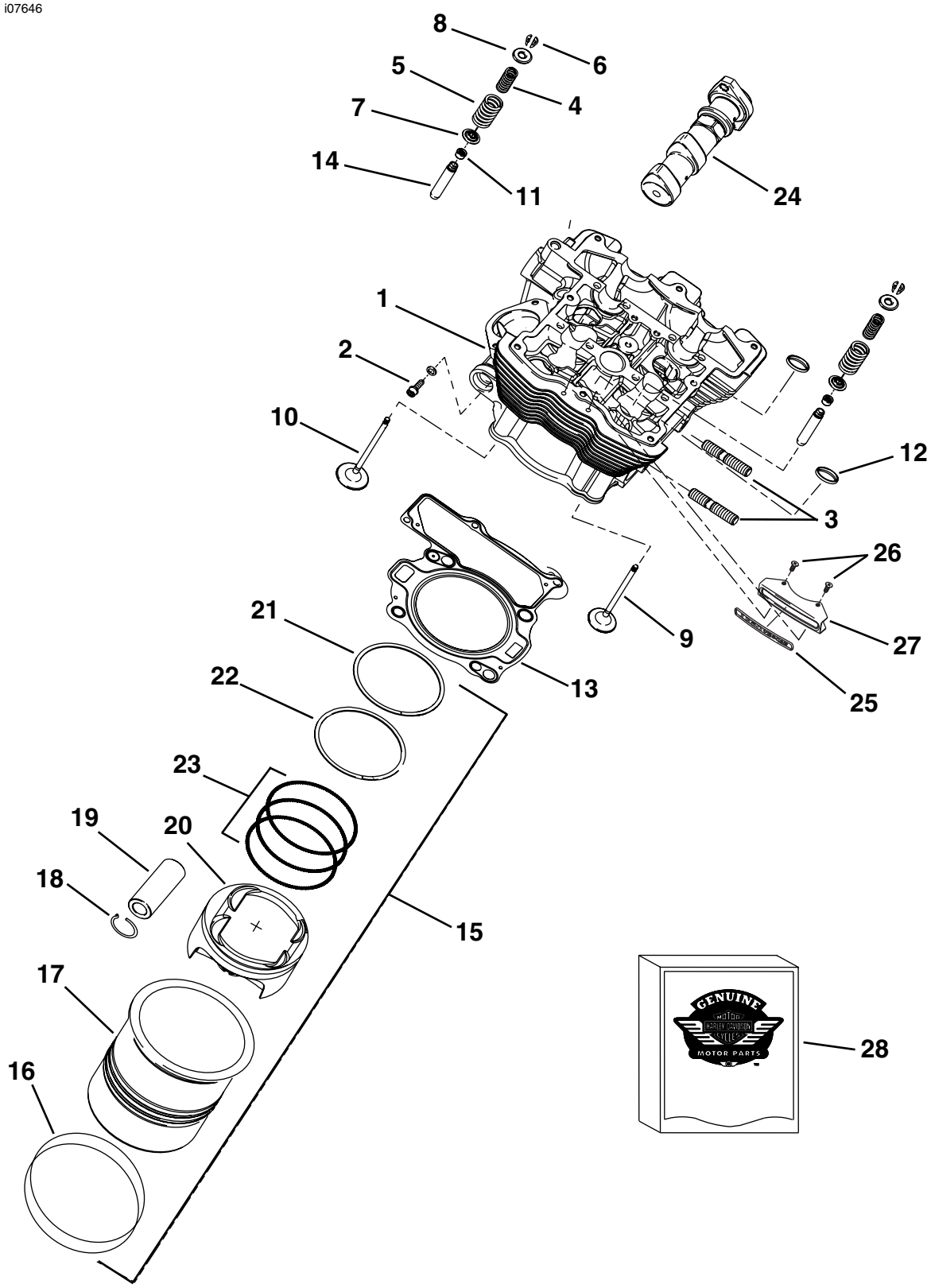
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GENUINE
MOTOR PARTS

Item	Description (Quantity)	Part No.
1	Front cylinder head assembly silver	17212-06K
	Includes the following items 2-14	
2	Screw, SHCS, M5-.8 x 10	1043MA
3	Stud bolt (2)	16448-01KA
4	Valve spring, inner (4)	18052-01K
5	Valve spring, outer (4)	18055-01K
6	Valve collar (8)	18057-01K
7	Valve spring retainer, lower (4)	18661-01K
8	Valve spring retainer, upper (4)	18662-01K
9	Exhaust valve (2)	18663-01K
10	Intake valve (2)	18664-01K
11	Valve stem seal (4)	18687-01K
12	Expansion plug (2)	769M
13	Front cylinder head gasket	17691-05K
14	Guide, valve (4)	18665-01K
15	Piston liner assembly (2)	22928-05K
	Includes the following items 16-23	
16	O-ring (2)	11314K
17	Cylinder liner	Not sold separately
18	Retaining ring (2)	22121-01K
19	Piston pin	22126-05K
20	Piston	Not sold separately
21	Ring, top compression	22930-05K
22	Ring, 2nd compression	22931-05K
23	Ring, oil control	22932-05K
24	Intake camshaft (2)	17431-05K
25	SE engine label insert (2)	29530-05K
26	Screw, countersunk hex socket, M3-0.5 x 8 (4)	4496M
27	Engine label bracket (2)	69280-05K
28	Engine overhaul gasket kit	17011-1K
The following items are not shown.		
	Rear cylinder head assembly silver	17213-06K
	Includes the following items	
	Screw, SHCS, M5-0.8 x 10	1043MA
	Stud bolt (2)	16448-01KA
	Cam chain jet	Not sold separately
	Valve spring, inner (4)	18052-01K
	Valve spring, outer (4)	18055-01K
	Valve collar (8)	18057-01K
	Valve spring retainer, lower (4)	18661-01K
	Valve spring retainer, upper (4)	18662-01K
	Exhaust valve (2)	18663-01K
	Intake valve (2)	18664-01K
	Valve stem seal (4)	18687-01K
	Expansion plug (2)	769M
	Rear cylinder head gasket	17692-05K
	EO label	Not sold separately